Section 5 - High Resolution Displays

The following paragraphs describe the Workstation's two 16-inch, high-resolution monitors. This information is organized as follows:

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References

Please refer to **Workstation Interconnect Diagram 00-878981** as you read this section.

Primary Display

The left-hand monitor is called the Primary display because it shows newly-acquired images. It is functionally identical to the right-hand Secondary display. The usable screen area on each monitor is 14.53 diagonal inches.

Location

Section 2 of this manual shows a **front view** and a **rear view** of the High Resolution displays, which are located on top of the Workstation chassis. **Remove the Monitor Cover** as described in Section 2 to gain access to the display assemblies.

Circuit Description

Each monitor is a purchased part, and does not have a schematic diagram available. A detailed circuit description is therefore not possible. You must replace a faulty monitor as an assembly, which includes the monitor chassis, the CRT, video and deflection electronics, and an AC-powered switching power supply.

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Video Input

Each monitor accepts standard-level (one volt peak-to-peak) composite video, and auto-selects one of the following horizontal frequency and vertical frequency combinations to match the horizontal and vertical timing of the current video input:

- Horizontal frequency of 61.80 kHz and a vertical frequency of 60 Hz

- Horizontal frequency of 77.25 kHz and a vertical frequency of 75 Hz

- Horizontal frequency of 60.02 kHz and a vertical frequency of 75 Hz

Regardless of timing characteristics, video input to either monitor must conform to RS-170 requirements, including:

- Negative polarity black

- Negative sync

- 1.0 Volt peak-to-peak amplitude

- 75 ohms input impedance (BNC connection)

1.0V   (100 RE)

.340V   (7.5 IRE)

.286V   (0 IRE)

0V   (-40 IRE)

RS-170 Video

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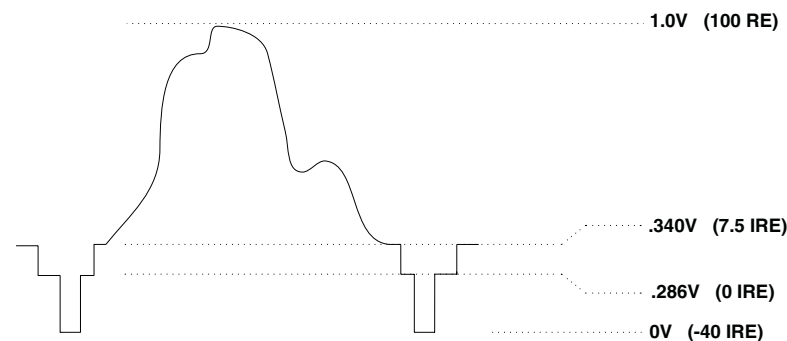
Digital Control Interface

Each monitor has a digital control interface that allows it to accept asynchronous RS-232 control signals originating from the Host Pentium CPU, which transfers them through ISA slot 2 to U34, a quad UART on the **System Interface PCB**. The UART then passes the control signals through buffer U18, line driver U26, and **Electronics Box** connector P1 to each monitor. Each monitor reports status information back to the Host Pentium CPU along the same path.

In earlier versions of the system, the Host Pentium CPU consists of the **Host Pentium CPU Motherboard**. In current versions of the system, the Host Pentium CPU consists of the **Single Board Computer** and **Passive Backplane**.

The asynchronous RS-232 interface on each monitor has the following characteristics:

•   Eight-bit serial transfer with one start bit, one stop bit, and no parity bit

•   9600 baud data rate

•   Monitor settings are updated via the serial link during vertical intervals for the CCD camera.

The RS-232 interface is a six-pin Molex Microfit connector (Molex #43045-0602) that has the following pinout:
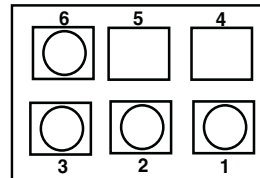
Pin 1 - TxD
Pin 2 - RxD
Pin 3 - Ground
Pin 4 - Not used
Pin 5 - Not used
Pin 6 - +15 Volts (used by Host CPU to verify that monitor is ON)

P2

Monitor Serial Connector P2

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High Resolution Displays

Each monitor has the following service and setup controls. The controls marked with an asterisk are adjustable via the RS-232 interface and RUT. The other controls are factory adjustments that should not be tampered with in the field.

Focus
*Horizontal Size
*Vertical Size
Vertical Linearity
Horizontal Hold
*Horizontal Position
*Main Brightness
*Contrast
G2 (Grid 2) Control
*Vertical Position

CAUTION: *Don't try to manually adjust any monitor control or any monitor power supply control. Permanent damage to the monitor may otherwise result. Instead, use RUT to adjust the monitor as described under MONITOR CALIBRATION.*

Monitor Control Registers

Each monitor is equipped with 16 non-volatile EEPROM registers that store monitor configuration information during power-down periods. The monitors retrieve this data from EEPROM upon power-up, and configure themselves according to the data in the registers.

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Power Requirements

Each monitor is equipped with an integral AC-operated synchronous switching power supply. AC power from TB4 (a terminal block at the rear of the Workstation centered below the monitors) enters a three-wire AC line at the rear of each monitor. Conductor identification is as follows:

Green/yellow - Chassis ground
Blue - Neutral
Black - Line

Each AC power supply accepts an input voltage between 90 and 135 VAC.

Test Points

There are no accessible test points on either monitor. However, you can check for AC power by probing TB4, check for video input by checking the video cable, and checking serial control signals by probing TB4, the video input cable, or the serial communications connector at the rear of each monitor.

AC Power

WARNING: *Perform the following step carefully to avoid dangerous AC line electric shock.*

Both monitors should be active any time the Workstation is powered up. Carefully probe TB4 to make sure each monitor is receiving 115 VAC power.

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Composite Video

You can observe the video signal to either monitor by removing the BNC connector from the video input jack and checking for the presence of **composite video** on the video cable.

Serial Control Signals

Each monitor accepts serial control signals from the Host CPU on connector P2, which is directly below the video BNC connector on the rear panel of each monitor.

P2-1 and P2-2 are at -8 Volts during normal operation. You will see activity on these pins only when you use the RUT utility to make adjustments to the monitor's brightness or contrast.

P2-6 should be at +11 Volts while the associated monitor is in the ON condition.

Circuit Breakers and Fuses

No monitor circuit breakers or fuses are accessible for servicing purposes.

Troubleshooting

When a monitor fails to operate, first make sure it is receiving AC power and an active composite video signal. If things look OK there, use RUT to determine if the monitor properly reports adjustment parameters and responds to adjustment commands. Replace a monitor when it fails to respond to RUT commands, fails to report the ON status, or does not respond to an active video signal.

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Removal and Replacement

Follow these steps to replace the Primary monitor:

1. Disconnect Workstation's AC line plug from AC outlet.

2. Remove **monitor cover** and set it aside.

3. Disconnect video cable from BNC connector at rear of monitor and move it out of the way.

4. Disconnect serial data cable from **P2** at rear of monitor and move it out of the way.

5. Disconnect monitor's AC power line from **TB4**.

6. Remove two torx screws that secure touch screen brace to touch screen bracket. Remove cables from cable routers on brace, and set brace and screws aside.

7. Remove four torx screws that secure monitor to rear mounting brackets.

8. Carefully left monitor assembly from Workstation.

9. Carefully set replacement monitor into Workstation.

10. Install four torx screws you removed in step 7. If necessary, adjust mounting brackets so CRT face fits snugly against monitor bezel.

11. Install touch screen brace you removed in step 6. Place cables back in cable routers.

12. Connect replacement monitor's AC power line to TB4. **Individual conductors are color coded**.

13. Connect serial cable you disconnected in step 4 to P2 on replacement monitor.

14. Connect video cable you disconnected in step 3 to video BNC connector on replacement monitor.

15. Connect Workstation's AC line plug to active AC outlet.

16. Turn on Workstation and perform **Monitor Setup** as described in Section 12 of this manual.

17. After monitor is correctly adjusted, install monitor cover and return Workstation to normal operation.

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Secondary Display

The Secondary display is the right-hand monitor. It's functionally identical in every respect to the Primary display. Physically, the Secondary monitor chassis is a mirror image of the Primary Display.

The **Touch Screen assembly**, located under the monitor bezel and surrounding the Secondary display's CRT, is functionally separate from the Secondary display, and is discussed in detail in Section 8 of this manual.

To replace the Secondary display, follow the **Removal and Replacement procedure for the Primary Display**.

Monitor Calibration

Refer to **Monitor Setup** in Section 12 of this manual for complete instructions on how to calibrate the size, brightness, and contrast of each Workstation monitor.

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